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this early stage two pairs are noticeably larger than the rest, and the difference becomes more pronounced as the chromosomes become arranged in the equatorial plate. The usual number of chromosomes is 28, but it is often higher. In the mother cells there are constantly 14 bivalent chromosomes, or gemini, one pair constantly larger than the rest. While zoologists are assigning the large chromosome a particular function in the determination of sex, it is too early to make any statement for plants. At present what is needed is extensive investigation along the lines of the present paper.—CHARLES J. CHAMBERLAIN.

Crown gall and sarcoma.—In a recent review¹⁶ of the bulletin on crown gall by SMITH, BROWN, and TOWNSEND, attention was called to the resemblance of the crown gall tumors to certain malignant animal tumors. SMITH has now issued a brief circular¹⁷ to announce the discovery of further evidence of this resemblance. The bacterium causing the primary tumor occurs also in the secondary tumors, associated with the tumor cells, the conclusion being that this is not a disease which propagates itself independently of the inciting organism. Furthermore, "tumor strands" were observed connecting primary and secondary tumors, being deep-seated offshoots from the primary tumor which wedge their way through stems and leaves like foreign bodies and give rise to secondary tumors, which subsequently rupture through to the surface of the plant. The full details, with illustrations, are promised in another bulletin.—J. M. C.

Symposium on reproduction.¹⁸—At the meeting of the Botanical Society of America held at Boston, December 27–31, 1909, a symposium on the nuclear phenomena of sexual reproduction was one of the features. Dr. DAVIS discussed the nuclear phenomena of sexual reproduction in the algae, and Drs. HARPER, CHAMBERLAIN, and MOTTIER discussed the subject in the fungi, gymnosperms, and angiosperms respectively. No new investigations were presented, since the object was not to record the results of recent personal research, but rather to present the subject in such a way as to make it helpful to the botanical public, and to stimulate and facilitate research in the various phases of the problem. Naturally, the principal emphasis was laid on fertilization and reduction of chromosomes. No serious differences of opinion appeared, except in regard to alternation of generations.—CHARLES J. CHAMBERLAIN.

¹⁶ BOT. GAZ. 52:75. 1911.

¹⁷ SMITH, ERWIN F., Crown gall and sarcoma. U.S. Depart. Agric., Bur. Pl. Ind., Circular no. 85. pp. 4. June 20, 1911.

¹⁸ DAVIS, B. M., HARPER, R. A., CHAMBERLAIN, CHARLES J., and MOTTIER, D. M., Nuclear phenomena of sexual reproduction in thallophytes and spermatophytes. Publication 45 of The Botanical Society of America. Reprinted from the American Naturalist of June, July, September, and October, 1910.